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An Integrated and Synergistic Systems Analysis Approach

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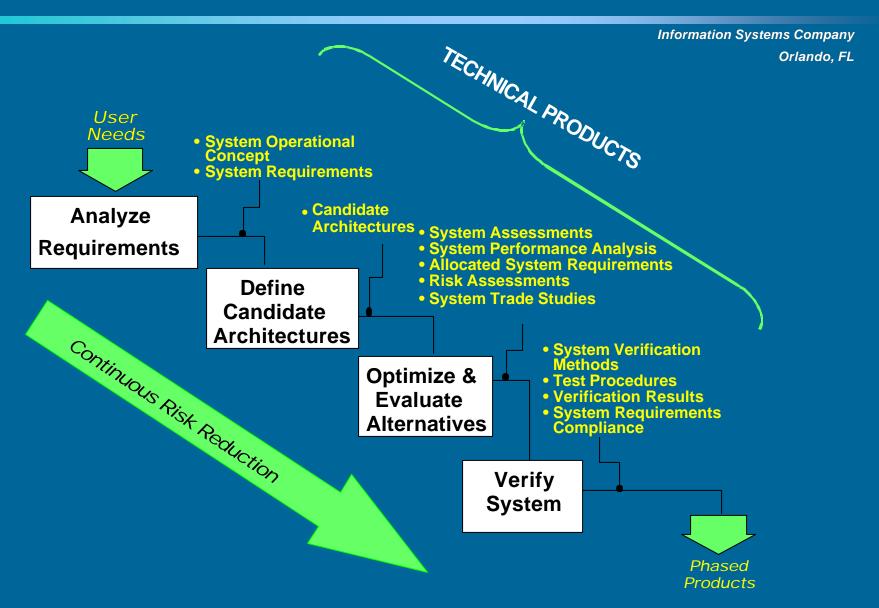
Lockheed Martin Information Systems

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Why introduce iteration into Systems Engineering?

- Enables refinement of analysis models as system design evolves
- Promotes analysis model re-use
- Permits concurrency and feeding of parameters from one model to another
- Ensures fully validated system that meets or exceeds customer needs
- Adheres to systems engineering process



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Transition to a structured iterative process by introducing integrated tools and establishing integrated engineering processes

Analyze Requirements

- Object Oriented Requirements Management Tool
- High Level Analyses

Define Candidate Architectures

- Functional Diagrams
- 00A
- Simulation & Modeling
- Visual Modeling
- Use Case Analysis

Optimize and Evaluate Alternatives

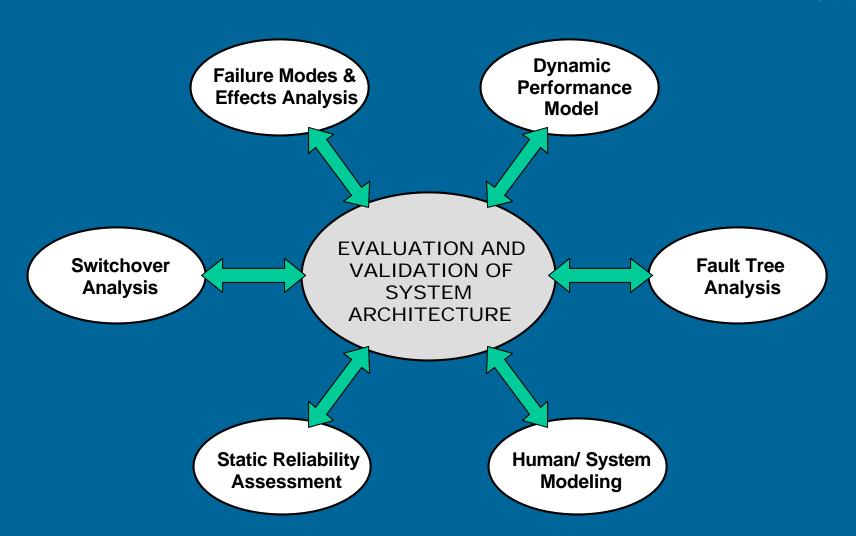
Analysis Refinement

Verify System

Continued Analysis Refinement

System Evaluation and Validation

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Architecture design

- Component data
- Software reliability data
- Human task reliability
 - Fault tree analysis
 - Markov transition analysis
 - Traditional reliability analysis
 - FMEA

Analyze Design in Static Mode

Problem Characterization

 Discrete event simulation

Network operations

Workload capacity

Projected system load

IT Device characteristics

Analyze Dynamics of Architecture

Static Inherent Design Reliability

Provides estimate of upper limit of system availability given perfect throughput of architecture

Dynamic Responsiveness

Provides estimate of upper limit of system responsiveness given total reliability of components

Integrated System Effectiveness Analysis

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- Benefits of synergistic engineering become apparent during integration and test
- Model results are instrumental in development of interface documents and test cases
- Traceability and design integrity are promoted by maintenance of relationships throughout the life cycle
- Simulations can augment testing by emulating hardware responses to software commands
- Virtual integration activities can be performed in parallel with actual hardware integration
- Visualization of architecture enables validation of software

Summary

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- Establishment of integrated and synergistic environment early in life cycle essential
- Manpower planning facilitated through personnel and domain knowledge migration
- Object oriented systems engineering processes promote total system design
- Transition to CMMI assessment facilitated with integrated engineering processes
- Enhancement to systems engineering tool suites critical for ensuring supportable and interoperable system designs